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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY, NEW SERIES, No. XV.

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I. — ELEOCHARIS OVATA AND ITS AMERICAN ALLIES.

IN attempting to place satisfactorily a number of strikingly different American plants, which, according to the standard works upon that group, must all be called *Eleocharis ovata*, a detailed study of the achenes has shown that our present conception of the species — especially in America — is remarkably indefinite. The commonest American plant passing as *Eleocharis ovata* is an annual species with many erect or ascending comparatively stout culms from 1 to 5 dm. high, capped by thick globose-ovoid or ovate-oblong obtuse densely flowered brown heads, 3 to 13 mm. long. The closely appressed ascending obovate-oblong or suborbicular scales are blunt, with scarious margins. The tubercle, usually as broad as the cuneate-obovate achene, is depressed, somewhat resembling in outline a high-crowned tam-o'-shanter cap; it is generally one third as high as the body of the achene. This common American plant (Figs. 1 to 7), now accepted as *E. ovata*, was described in 1809 by Willdenow as *Scirpus obtusus*, and it was subsequently transferred by Schultes to *Eleocharis*. For three fourths of a century the plant was generally treated by Torrey, Gray, and other recognized authorities on the group, as a distinct American species. In his monograph of the *Cyperaceæ*, however, Böckeler reduced¹ our common American *Eleocharis* (*Heleocharis*) *obtusa* to the well known *E. ovata* of central Europe. This disposition of the plant was accepted by Mr. C. B. Clarke in his study of the European species of *Eleocharis*,² and it has been adopted by subsequent American students of the group, — Britton, Watson, etc. Habitally the two plants are essentially alike, but a careful examination of achenes from an abundance of American and European specimens reveals certain differences which appear quite constant. The

¹ Böckeler, *Linnaea*, (1869-70), XXXVI. 463.

² *Jour. Bot.*, XXV. 268.

achene of the European *E. ovata* (Figs. 9, 10) is obovate or inverted-pyriform in outline, and it is about three fourths as high and two thirds as broad as the obovate or cuneate-obovate achene of the typical American plant (Figs. 4 to 7) which commonly passes under that name. The tubercle of true *E. ovata* averages four sevenths as broad as the achene, while that of the American plant equals the achene in breadth. Though, as already stated, the European *E. ovata* and the American plant recently united with it are not readily distinguished by superficial characters, the apparently constant differences in their achenes and tubercles are sufficient to justify us in regarding our own plant as distinct from that of Europe, and in restoring to it the distinctive name *Eleocharis obtusa*, under which it was so long known to American botanists.

Although the common American plant, which, for the last three decades, has passed as *Eleocharis ovata*, proves on critical study to differ from that species in certain well marked and constant characters, the true *E. ovata* of Europe is not entirely wanting in our American flora. The American plant, however, which not only in habit but in the characters of achene and tubercle closely matches the European specimens and plates, is as yet known from only four northern stations, in New Brunswick, Maine, Vermont, and Michigan. In these specimens, in habit and achenes undoubtedly *E. ovata*, the oblong or ovate-oblong scales are very dark chestnut-brown or purplish, distinctly darker than is usual in *E. obtusa*.

In October, 1878, Mr. E. H. Hitchings collected in Dedham, Massachusetts (presumably in Purgatory Swamp), an *Eleocharis* which has proved unusually puzzling to those who have subsequently worked upon the genus. Two sheets of the plant, showing large and small specimens, are preserved in the Gray Herbarium, where they have been frequently shifted from one species cover to another. Originally Dr. Gray wrote upon one of the sheets, a "remarkable form, I think, of *Eleocharis intermedia*." Subsequently both sheets were referred by Dr. Watson to *E. obtusa*; but when studying the plants in the preparation of his synopsis of "The Genus *Eleocharis* in North America,"¹ Dr. N. L. Britton referred the two Dedham sheets to different species, the smaller specimens to *E. olivacea*, the other to *E. palustris*. Why the two sheets should be thus separated we cannot make out. They are, to be sure, hardly identical in size, but in general habit, scales, and achenes they are the same,

¹ Jour. N. Y. Microsc. Soc., V. 95-111.

and they are both annuals with small tufts of merely fibrous roots. Both *Eleocharis palustris* and *E. olivacea*, on the other hand, are well known, and are always described as perennials with definite root-stocks. Another Massachusetts specimen, collected by C. E. Perkins at Winchester, soon after Mr. Hitchings found the puzzling Dedham plant, has likewise been referred to both *E. obtusa* and *E. olivacea*, and doubtfully to *E. diandra*. In attempting, then, to place satisfactorily this anomalous plant, recent botanists have associated it at different times with no less than five species.

The plant is probably of general, though perhaps not of abundant, distribution throughout eastern Massachusetts. In the middle of October, 1897, a small plant, which may well be a depauperate form of the Dedham plant, was collected by E. F. Williams and J. M. Greenman at Massapoag Pond in Sharon. Exceptional individuals among these autumnal specimens have short capillary stolons, but, except for this unusual development, they can hardly be distinguished from the smallest specimens collected by Mr. Hitchings. A little later, specimens identical with the larger Dedham plant were collected by Mr. Williams in the bog south of Annursnack Hill in Concord.

In northern Maine, on the upper waters of the St. John and Penobscot Rivers, where *Eleocharis palustris* and *E. intermedia* are common species, this Dedham plant is also abundant. There it has been carefully watched in the field, where it forms dense tufts of generally slender and decidedly flexuous culms, which are often quite prostrate upon the ground, giving the plant a superficial resemblance to *E. intermedia*. From the generally common *E. obtusa*, whose place this slender flexuous plant (Figs. 15 to 22) seems to take in northern Maine, it is otherwise superficially distinguished by its dark chestnut or purple ovate or ovate-lanceolate acutish scales, which are looser in the heads and more spreading than the paler brown ascending closely appressed obovate obovate-oblong or suborbicular blunt scales of *E. obtusa*. The color of the scales, though fairly constant, is not, however, so distinctive a character of the Dedham and northern Maine plant as the size and shape of the tubercle. The tubercle of this dark-scaled plant is deltoid-conical, slightly or not at all constricted at the base, suggesting in outline a half-closed parasol with incurved edge; it is about three fifths as wide as the obovate or inverted-pyriform achene which it caps, and usually about three sevenths as high as the body of the achene. The tubercle of *E. obtusa*, on the other hand, as already described, is usually as broad as the cuneate-obovate achene, and it is depressed and generally one third as high as the body of the achene.

The retrorsely barbed bristles of this species, too, are slightly coarser than in the other plant, though for distinguishing the species this character is less to be relied upon than those found in the scales and tubercles.

From *Eleocharis palustris* and *E. olivacea* this northern plant may generally be quickly separated by its annual habit, though, as noted in the Massapoag specimens, it very rarely produces late autumnal stolons. Its flexuous densely-clustered slender culms and its comparatively short ovate heads sufficiently distinguish it from the taller erect *E. palustris*, with its narrower elongated heads. In habit the plant strongly suggests *E. olivacea* (Figs. 23, 24), but in this latter perennial species the tubercle is narrower and lower, and of different outline: the sides, instead of being essentially straight, have a strong concave curve; and below, instead of rounding gradually to a slightly constricted base, the tubercle flares somewhat like a saucer.

Like *Eleocharis intermedia* and *E. diandra*, to which the northeastern plant has sometimes been referred, it is an annual. In habit it strongly suggests the former species, but that (Figs. 25, 26) has narrower spikes, and the more elongated achene is capped by a decidedly narrow deltoid conical tubercle reminding one of a very tall fool's cap. Nor is the plant satisfactorily referred to Charles Wright's obscure *E. diandra*. From such specimens as we know (the original material) that species (Figs. 53 to 58) seems to be of erect habit, and the narrower scales are pale brown with dark green midribs. The plant is unique in this group of annual species (excepting forms of the very different *Engelmanni* section) in its entire lack of bristles; and its smaller obovate achene is capped by a depressed tubercle about as broad and half as high as that of Mr. Hitchings's plant, but in outline resembling a miniature tubercle of *E. obtusa*. In short, the northeastern plant, which has been referred at various times to the five species here discussed, is as distinct from all of them as are they from one another, and the only other described plant which seems to approach it is a form of *E. ovata* of continental Europe.

Though *E. ovata* is an erect plant, and has been so described by most European botanists, a single sheet in the herbarium of Dr. Charles W. Swan shows an extreme form collected by Seidel at Reichenbach in Silesia, which is identical with the low flexuous-culmed plant first found in America by Mr. Hitchings. This depressed plant with flexuous culms hardly suggests to the casual observer the familiar erect *E. ovata*, but it is certainly difficult if not impossible to find in their achenes any satisfactory distinctions; and in northern Maine, at the single known station for the erect *E. ovata*, there are puzzling specimens clearly intermediate

between the two. This low form, more common in New England than the typical erect *E. ovata*, is doubtless the Silesian variety *Heuseri* of Uechtritz. From the description alone of Terracciano's var. *humifusa*, our plant may be the same as that Italian form. No specimens of the latter have been seen, and as the New England plant is clearly identical with the more northern var. *Heuseri*, Uechtritz, that name will here be taken up.

This flexuous dark-headed plant is not the only anomalous form long referred to *Eleocharis ovata*. A tall northwestern plant, 7 or 8 dm. high, has been considered by Mr. C. B. Clarke as a variety of this species. Aside from its unusual size, this plant is well characterized by the remarkable broadly obcordate tubercle (Figs. 11, 12), which is not at all compressed and fully half as high as the achene itself. Other northwestern plants, however, connect this extreme form directly with the typical *E. obtusa*, so that it seems undoubtedly an extreme variety of that species. Another striking form which an abundance of material shows to be in reality an extreme variation of *E. obtusa* is a slender somewhat depressed plant of the east. This plant (Figs. 13, 14), with capillary erect or generally decumbent or spreading culms mostly a decimeter or less (very rarely 2 dm.) high, is frequent in damp sand or in exsiccated places in New England and other eastern States. The short few-flowered heads are from 2 to 5 mm. long, and the oblong obtuse scales are slightly more spreading than in the true *E. obtusa*. The achenes, however, though a little smaller, are not distinguishable from those of that species, and occasional specimens occur which might equally well be referred to either form of the plant. For this reason, although the plant with capillary short culms seems habitually very distinct, it is here treated as a variety of *E. obtusa*. The smaller achenes of this low plant are about as high as those of the European *E. ovata*, but they are readily distinguished from that species by their greater breadth and by their tubercles.

Some other plants which have been associated in our herbaria with *Eleocharis ovata* apparently have less affinity with that species. *E. diandra*, Charles Wright (Figs. 53 to 58), has already been briefly discussed. Prior to publishing the species himself, Mr. Wright sent specimens to Dr. Gray who then considered the plant a "pretty good species," and gave it a provisional (though never published) name in the herbarium. In 1883 Mr. Wright described his plant, distinguishing it by a number of apparently constant characters from *E. obtusa*. In his "Genus Eleocharis in North America," however, Dr. Britton treated the plant as a probable form of the older species ("*ovata*"). In the subsequent edition of Gray's

Manual it is given only minor recognition, as a probable form of *E. ovata*," and in the Illustrated Flora it is not even mentioned. Though the plant is as yet known only from a limited area in the Connecticut valley, its structural characters distinguish it from *E. ovata* and *E. obtusa* quite as clearly as do those of the now well recognized *E. Engelmanni*.

An Arkansas plant (Figs. 27 to 29) sent by Prof. F. L. Harvey to the late William Boott has been passing as a form of *E. obtusa*. In habit the plant resembles both that species and *E. diandra*, but its capillary culms are as fine as in the most slender specimens of the latter species. The heads, however, are not broad as in those species, but lanceolate and acute, 5 to 8 mm. long. The very pale ascending scales are lanceolate or oblong-lanceolate and acuminate. The achene, though not unlike that in the smallest form of *E. obtusa*, is shorter and broader than is usual in that plant, and the tubercle is hardly so depressed.

Another plant (Figs. 45 to 52) which has been included in the complex called *Eleocharis ovata* is a low but erect plant of the Northwest, occurring from the Cœur d'Alene valley southwestward through Oregon to the northern Sierra Nevada of California and extending eastward to the northern prairie region. The original specimens sent by Mrs. Pulsifer Ames from the Sierra Nevada in 1876 were referred by Dr. Gray to *E. palustris*, and subsequently by Dr. Watson to *E. obtusa*. Similar specimens, if not from the identical collection, were sent by Mr. Lemmon to William Boott, who pronounced them *E. obtusa*, as he did also a plant sent a year later by Mr. Howell from Multnomah Co., Oregon. Excellent material of essentially the same plant recently distributed by the National Herbarium from the Cœur d'Alene valley in Idaho is labelled *E. ovata*, as are also exceptionally large specimens collected by Professor Macoun in Manitoba. Though habitally somewhat suggesting the common *E. obtusa*, this northwestern annual plant has narrower looser-flowered acutish heads varying from ovate-lanceolate to oblong-lanceolate, and the narrower chestnut-tinged scales are acutish and more spreading. The achenes, though not unlike those of *E. obtusa*, are capped by more compressed tubercles resembling those of *E. Engelmanni*. The bristles, too, are like those of the latter species, about equalling the achene or much shorter, not exceeding it as in *E. obtusa*. In the shape of its spike and tubercle, then, and in its bristles, the northwestern plant is more like *E. Engelmanni* than *E. obtusa*. From that species it differs in its more ovoid head, and darker more acutish and spreading scales. *E. Engelmanni*, as ordinarily recognized, is a species of low altitudes, — primarily in the middle States, and rarely reaching the Atlantic seaboard.

For this reason, and in view of the slight though apparently constant habital and structural differences, it seems hardly justifiable to identify the Sierra Nevada and northern plant with the species of the central and southern prairie States.

Eleocharis Engelmanni (Figs. 30 to 40), which has been treated, now as a variety of *E. obtusa* (*ovata*), now as a distinct species, is generally given specific recognition. Resembling *E. obtusa* in habit, it is fairly characterized by its narrower elongated head, by its more compressed tubercle, and by its shorter bristles. It requires no detailed discussion here.

From these recent studies it seems that the American *Eleocharis obtusa* of Schultes is really distinct from the European *E. ovata* with which it has been united, but that, although rare with us in its typical form, the true *E. ovata* is represented in northeastern America principally by the little known Prussian (Silesian) var. *Heuseri*. And many annual plants, it seems, which have been associated with these species in our herbaria, though in some cases as closely related to *E. Engelmanni*, cannot be satisfactorily identified with either species. Nor are these plants more readily placed with the other species, *E. intermedia*, *E. palustris*, and *E. olivacea*, with which they have sometimes been associated. On this account they are here proposed, some as distinct specific types, others as extreme varieties of older species; and with the hope of diminishing the confusion which has so long existed among them, the following synopsis has been prepared of all the annual American forms (excluding the very distinct *E. intermedia*) here discussed.

In the preparation of this paper, besides the extensive collection of *Eleocharis* in the Gray Herbarium, and those in the Herbaria of the United States National Museum, the Canadian Geological Survey Department, Brown University, and the New England Botanical Club, the valuable sheets in many private herbaria have been placed at my disposal. To Messrs. F. V. Coville, James M. Macoun, and J. Franklin Collins I am indebted for the use of material in their charge, and to the following gentlemen, whose private collections have largely supplemented the representation of species exhibited in the public Herbaria consulted: — President Ezra Brainerd, Judge J. R. Churchill, Drs. G. G. Kennedy and C. W. Swan, Rev. E. C. Smith, and Messrs. Walter Deane, E. L. Rand, W. P. Rich, and E. F. Williams.

SYNOPSIS OF SPECIES.¹

* Bristles overtopping the body of the achene.

+ Tubercle nearly or quite as broad as the achene.

↔ Heads from globose-ovate to ovate-oblong: scales brown, obtuse.

E. OBTUSA, Schultes. — Figs. 1 to 7. — Culms generally many, comparatively stout, erect or ascending, 1 to 5 dm. high: heads globose-ovoid to ovate-oblong, obtuse, densely-flowered, 3 to 13 mm. long, 3 to 5 mm. broad: scales obovate, obovate-oblong, or suborbicular, ascending, close-appressed, dull brown or rarely chestnut-brown with pale scarious blunt or rounded margins and comparatively pale broad midribs: achenes mostly cuneate-obovate; tubercle depressed, about a third as high as the body of the achene. — Mant. ii. 89; Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 302; Gray, Man. 522; &c. *E. (Heleocharis) ovata*, Böckeler, Linnæa, xxxvi. 462, in part; C. B. Clarke, Jour. Bot. xxv. 268, in part; Wats. & Coulter in Gray, Man. ed. 6, 574; Britton, Jour. N. Y. Microsc. Soc. v. 102; Britton & Brown, Ill. Fl. i. 251, f. 584 (as to habital sketch); not R. Br. *Scirpus obtusus*, Willd. Enum. Hort. Berol. i. 76. *S. capitatus*, Walt. Fl. Car. 70; Pursh, Fl. i. 55; Ell. Sk. i. 77; Torr. Fl. N. & Midd. U. S. 45; and many other authors; not Willd. *S. ovatus*, Muhl. Cat. 6; Pursh, Fl. i. 54; not Roth. *S. elegantulus*, Steud. Cyp. 317. — A common plant in muddy or wet places nearly throughout eastern North America, growing from Whyecozmah, Cape Breton (*Macoun*), Kent County, New Brunswick (*Fowler*), Piscataquis County, Maine (*Fernald*, no. 251), Ste. Clotilde, Quebec (*St. Cyr*), and Ottawa, Ontario (*Macoun*), to Minnesota (*Woods, Sandberg*, no. 669, *Taylor*), Iowa (*Butler, Fink*), and Kansas (*Norton*, no. 545) southward to the Gulf of Mexico. Reappearing in the northwestern United States and British Columbia: Green River Hot Springs, Washington (*Piper*, no. 6280); Clarke Co., Washington (*Suksdorf*, no. 2328); Pitt River, British Columbia (*Hill*). Some northern specimens not otherwise distinguishable from typical *E. obtusa* have castaneous scales.

Var. jejuna. — Figs. 13, 14. — Culms capillary, suberect or generally decumbent or spreading, 1 (rarely 2) dm. or less high: heads smaller, fewer-flowered, 2 to 5 mm. long: scales more spreading: achene

¹ The number and character of the stamens have sometimes been given prominence in distinguishing species of *Eleocharis*. When the achenes are well matured, however, the stamens are too often shrivelled or entirely gone, so that the differences found in them are hardly satisfactory criteria for determining species.

somewhat smaller, with the tubercle about three sevenths its height. — In damp sandy soil or exsiccated places, probably throughout the range of the species. MAINE, sandy intervale, Milo Junction, Sept. 12, 1896 (*M. L. Fernald*, no. 2838); river margin, Oldtown, Sept. 7, 1898 (*M. L. Fernald*, no. 2721); sandy shore, Orono, Sept. 7, 1893 (*M. L. Fernald*); damp sandy ground, North Berwick, Sept. 25, 1897 (*J. C. Parlin & M. L. Fernald*): NEW HAMPSHIRE, Mascoma River, Lebanon, Aug. 19, 1890 (*G. G. Kennedy*): VERMONT, Middlebury, Sept. 21, 1878 (*Ezra Brainerd*): MASSACHUSETTS, shore of North Reservoir, Winchester, Oct. 6, 1894 (*W. P. Rich*); Milton, Sept. 25, 1881 (*C. W. Swan*); Blue Hills, Sept. 29, 1894 (*W. H. Manning*); Great Pond, South Weymouth, Sept. 19, 1891 (*W. P. Rich*); without locality (*Morong*): RHODE ISLAND, South Kingston, Aug. 3, 1847 (*S. T. Olney*): ILLINOIS, Jackson Co., July 16, 1873 (*G. H. French*). Various specimens, as a sheet in the herbarium of the New England Botanical Club from Revere, Mass. (*Young*), a taller but slender small-headed plant from Framingham, Mass. (*E. C. Smith*), specimens from Harlan County, Kentucky (*Kearney*, no. 27), and from Indian Territory (*Bush*, nos. 632, 633), connect this variety directly with typical *E. obtusa*.

Var. *gigantea*. — Figs. 11, 12. — Culms stout and tall, 5 to 8 dm. high: heads ovate-oblong, 9 or 10 mm. long, 5 mm. broad: scales ovate, dark brown: achene as large as in the species, the broad obcordate tubercle not depressed, about five eighths as high as the achene. — *E. ovata*, var. *gigantea*, Clarke in Britton, Jour. N. Y. Microsc. Soc. v. 103 (*nomen nudum*). *E. obtusa*, Watson, Bot. Calif. ii. 222, in part, not Schultes. — Cascade Mts., "Oregon" (i. e. Washington), 49° N. Lat., 1859 (*Lyall*); bogs near New Westminster, British Columbia, Aug. 28, 1893 (*Macoun*, no. 7557). A low more slender and smaller-headed plant collected by Mr. Howell in Multnomah County, Oregon, July, 1877 (no. 409), and by Professor Macoun at Agassiz, British Columbia, May 20, 1889, has the smaller achene capped by a large tubercle, thus connecting this variety with the typical form of the species.

++ ++ Heads lanceolate: scales pale, acute.

E. lanceolata. — Figs. 27 to 29. — Culms slender, almost capillary, erect, 2 dm. high: heads 5 to 8 mm. long, 2 mm. broad, acutish: the hyaline green-ribbed scales subappressed: achene broadly obovate, with a scarcely depressed tubercle one half its height. — Collected in central Arkansas, July, 1882 (*F. L. Harvey*, no. 8).

+ + Tubercle distinctly narrower than the achene.

E. ovata, R. Br. — Figs. 8 to 10. — Habitally resembling *E. obtusa*, the narrower but obtuse scales darker colored: the deltoid-conical often somewhat depressed tubercle about four sevenths as broad and about three sevenths as high as the body of the obovate or inverted-pyriform achene. — Prodr. Fl. N. Holl. 224 in adn.; Roemer & Schultes, Syst. ii. 152; Reichenb. Fl. Germ. Excurs. 77 (*Heleocharis*); Nees, Gen. Fl. Germ., ii. t. 18, f. 17-20; Ledeb. Fl. Ross. iv. 245 (*Elaeocharis*); Bockeler, Linnæa, xxxvi. 462 (as *Heleocharis*, excluding *H. obtusa*); Nyman, Consp. Fl. Europ. 766; C. B. Clarke, Jour. Bot. xxv. 268 (excluding *E. obtusa* and its syn.); Terracciano, Malpighia, ii. 310 (excluding *E. obtusa*); Richter, Enum. Pl. Europe, i. 143. *Scirpus capitatus*, Schreb. Spic. Fl. Lips. 60 (according to various European authors), not Willd. *S. ovatus*, Roth, Tent. Fl. Germ. ii. pt. 2, 562, & Cat. i. 5; Sturm, Fl. iii. Heft 10, with plate; Host. Gram. iii. 56; Fl. Dan. xi. t. 1801; Reichenb. Ic. Fl. Germ. viii. 37, t. 295, f. 700, 701; Anders. Cyp. Scand. 11, t. 2, f. 25. *S. compressus*, Moench, Meth. 349. *S. annuus*, Thuill. Fl. Bav. ed. 2, i. 22 (acc. to European authors). *S. nutans*, Bergeret, Fl. Pyren. i. 43 (acc. to European authors). *S. soloniensis*, Dubois, Meth. Orl. 249 (acc. to European authors). *S. multicaulis*, Gmel. Fl. Badens, i. 96. *S. turgidus*, Pers. Syn. i. 66. *Bulbostylis ovata*, Steven, Mém. Soc. Imp. Nat. Mosc. v. 355. *Clavula ovata*, Dumort. Fl. Belg. 143. *Eleocharis ovatus*, Nees, Linnæa, ix. 294. — The common form of the species in central Europe. In America definitely known from only four stations: ditches and boggy ground, Campbellton, New Brunswick, Sept. 4, 1882 (*John Macoun*); shallow pool, Masardis, Maine, Sept. 10, 1897 (*M. L. Fernald*, no. 2837); Middlebury, Vermont, July 6, 1878 (*Ezra Brainerd*); muddy places with *E. obtusa*, Keweenaw County, Michigan, Aug., 1886 (*O. A. Farwell*, no. 547, in part). Probably of wider distribution in Canada and the northern States.

Var. *HEUSERI*, Uechtritz. — Figs. 15 to 22. — Culms very numerous, slender and flexuous, often recurved or prostrate, from 3 cm. to 3 dm. long, of very different lengths on the same individual: heads dark chestnut-brown or purplish; the acutish scales more spreading than in the species: tubercles generally less depressed. — Uechtritz in Garcke, Ill. Fl. Deutschl. Aufl. 17, 625. *E. olivacea*, Britton, Jouv. N. Y. Microsc. Soc. v. 101, in part (as to Dedham plant), not Torr. — Common in wet or springy places or even in shallow water in northern Maine, apparently less abundant in eastern Massachusetts. Collected by the writer at the

following stations in MAINE:— St. Francis, Aug. 26, 1893, no. 2836; Masardis, where it passes to the species, Sept. 8, 1897, no. 2834; Island Falls, Aug. '28, 1897, no. 2835; Blanchard, Sept. 4, 1897, no. 2833; Great Works Meadow, Clifton, Sept. 22, 1898, no. 2772. MASSACHUSETTS, bog, south of Annursnack Hill, Concord, Oct. 24, 1897 (*E. F. Williams*); Winchester, Sept. 19, 1881 (*C. E. Perkins*); Dedham, Oct., 1878 (*E. H. Hitchings*); Sharon, Oct. 17, 1897 (*E. F. Williams & J. M. Greenman*). Also in Prussia (Lusatia & Silesia) where it is apparently rare.

* * Bristles about equalling or shorter than the body of the achene, or obsolete or none.

← Tubercle nearly or quite as broad as the achene.

++ Heads narrow-oblong or sub-cylindric; the blunt ascending scales close-appressed.

E. ENGELMANNI, Steud. — Figs. 37 to 40. — Habitally resembling *E. obtusa*, the comparatively slender culms 1.5 to 3 dm. high: heads brownish, 5 to 15 mm. long, 2 to 3 mm. broad, very rarely compound: achenes similar to those of *E. obtusa*, but the flatter tubercle only about one fourth the height of the body of the achene: the bristles about equalling the achene and retrorsely barbed. — Syn. pt. 2, 79; Britton, Bull. Torr. Club, xv. 100. *E. ovata*, var. *Engelmanni*, Britton, Jour. N. Y. Microsc. Soc. v. 103. — A little known species originally collected by Dr. Engelmann in marshy places in the hills west of St. Louis, Sept., 1845; Texas? (Mex. Bound. Surv. no. 1527); and later found at Wethersfield, Connecticut (*Chas. Wright*), and on Pine Hill, Medford, Massachusetts, Aug. 19, 1880 (*C. W. Swan*). Better known in the

Var. *DETONSA*, Gray. — Figs. 30 to 36. — Generally a little stouter than the species: the bristles absent or represented only by their short naked bases. — Gray in Patterson, Cat. Pl. Ill. 46, & Bot. Gaz. iii. 81. *E. obtusa* β , Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 304. — MASSACHUSETTS, "Hills, Waltham" (*B. D. Greene*); Woburn, Oct., 1878 (*E. H. Hitchings*, *Thos. Morong*); shores of Winter Pond, Winchester (*W. Boott*, *E. H. Hitchings*, *C. W. Jenks & C. W. Swan* [a monstrous form with capitate proliferous clusters], *E. F. Williams*, &c.): PENNSYLVANIA, damp sandy ground, Tinicum, Delaware County (*A. H. Smith*): MICHIGAN, Detroit (*W. Boott*): INDIANA, borders of ponds, Lafonte (*E. J. Hill*): ILLINOIS, river bottoms, Oquawqua (*H. N. Patterson*): S. DAKOTA, Bangor (*Griffiths & Schlosser*): NEBRASKA, Fillmore Co. (*J. H. Wibbe*): INDIAN TERRITORY, border of pond, Fort Sill (*C. S. Sheldon*, no. 256): ARIZONA, Grand Cañon of the Colorado (*F. H.*

Knowlton, no. 231). A few specimens, cited by Dr. Britton under *E. Engelmanni*, I have not seen, but some of them may well belong to this variety, which is not recognized by him.

Var. *robusta*. — Figs. 41 to 44. — Culms stout, about 3 dm. high: the pale oblong-lanceolate heads becoming 2 cm. long, 3.5 or 4 mm. broad: achenes distinctly larger than in the other forms, the thicker tubercle less flattened, resembling that of *E. obtusa*, about one third as high as the achene: bristles as in the species. — MISSOURI, Montier, where it is said to be common, June 30, 1894 (*B. F. Bush*, no. 585); Springfield, 1889 (*J. W. Blankinship*); pond, Lawrence Co., June 19, 1890 (*W. J. Spillman*); ravines in the Ozarks, Shannon Co., July 6, 1890 (*B. F. Bush*, no. 42): essentially the same plant collected in western South Dakota, Sept., 1892 (*D. Griffiths*).

++ Heads ovate-lanceolate to oblong-lanceolate; the acute or merely bluntish scales more spreading.

E. monticola. — Figs. 45 to 50. — Culms erect, 1 to 2.5 dm. high: heads 6 to 9 mm. long, 2 to 3.5 mm. broad: scales chestnut-brown or purplish with paler midribs and margins: achenes and tubercles resembling those of *E. Engelmanni*; the bristles equalling or slightly exceeding the achene. — *E. obtusa*, Watson, Bot. Calif. ii. 222 (as to Plumas County and Oregon plants), not Schultes. *E. ovata*, var. *Engelmanni*, Britton, Jour. N. Y. Microsc. Soc. v. 103, in part (as to Lemmon specimen). — Plumas County, California, 1876 (*Mrs. Mary E. Pulsifer Ames*); northern Sierra Nevada of California (*J. G. Lemmon*, no. 485); Multnomah County, Oregon (*Howell*, no. 408). Distinguished from the more eastern and southern *E. Engelmanni* principally by its more ovoid darker heads, and less appressed acutish scales, and like the latter species losing the elongated setulose portions of its bristles in

Var. *leviseta*. — Figs. 51, 52. — Bristles represented only by their short naked bases. — In muddy places, valley of Cœur d'Alene River, Kootenai County, Idaho, July 14, 1892 (*Sandberg, MacDougal & Heller*, no. 649); and in a muddy place west of Killarney, Manitoba, Aug. 1, 1896 (*John Macoun*, no. 16365).

+ + Tubercle distinctly narrower than the achene.

E. DIANDRA, Chas. Wright. — Figs. 53 to 58. — Culms slender, erect, 2 or 3 dm. high: heads ovoid, obtuse or acutish, 4 to 6.5 mm. long, 2 to 3.5 mm. wide: the small pale brown ovate or oblong-ovate scales acutish or blunt, ascending but scarcely appressed: achenes small, broadly obovate or inverted pyriform, capped by a compressed tubercle resembling that

of *E. obtusa*, but only about five eighths as broad as the achene: bristles few and short, generally none. — Bull. Torr. Club, x. 101; Britton, Bull. Torr. Club, xv. 100 (under *E. Engelmanni*¹); Britton, Jour. N. Y. Microsc. Soc. v. 102 (under *E. ovata*). — On high sand-bars of the Connecticut River, between Hartford and Wethersfield, Connecticut (*Chas. Wright*). A little known species; not satisfactorily referable, however, to either of the older forms with which some authors have placed it.

While studying the material associated with *Eleocharis ovata*, the annual plants passing as *E. intermedia* were also examined. This comparatively rare species is generally well understood, but a plant growing in marshes on the Gatineau River (a tributary of the Ottawa) has a very different achene, and it may well be distinguished, in recognition of its discoverer and his equally alert father, as

E. Macounii. — Fig. 26^a. — Annual: culms slender, weak, the longest 2 or 2.5 dm. long: heads elliptic-lanceolate, about 1 cm. long, more densely flowered than in *E. intermedia* (Fig. 25), the ovate-lanceolate or oblong-lanceolate acutish or blunt scales dark brown: achene much compressed, obscurely triangular in cross-section, obovate, less elongated than that of *E. intermedia* (Fig. 26); the deltoid-conical tubercle nearly as broad and one half as high as the body of the achene. — Borders of marshes, North Wakefield, Quebec, Sept. 13, 1893 (*James M. Macoun*, no. 7552). In its elongated dark heads this Canadian plant more nearly resembles the European *E. carniolica* than the American *E. intermedia*. From them both, however, it is clearly distinguished by its more compressed obscurely angled achene, and its much broader tubercle.

¹ The reference here made by Dr. Britton to a note of Dr. Gray in Bot. Gaz. iii. 81, must have arisen through a misapprehension, for the only plants mentioned by Dr. Gray in the place cited are true *E. Engelmanni* and its var. *detonsa*.